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E-payment Acceptance: Extended UTAUT Model with Security Factor

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Abstract: We examine the impact of different factors that affect the acceptance of e-payment in Jordan. The theoretical base of the research is UTAUT with an additional factor of security. The design of the study is quantitative and the data collection instrument was close-ended questionnaire the included the questions related demography of the respondents as well as the variables presented in the model. The sample size was 370 banks customers. The data analysis were performed using Smart PLS 3. With 5 predictors on behavioural intention, the R2 was 0.461. Effort expectancy, facilitating condition, performance expectancy, and social influence were all positively related to behavioural intention. However, for the perceived security, it is shown that the behavioural intention does not play a significant factor. Finally, our model provides guidelines at the managerial level to advance their system of e-payment.
Keywords: E-payment, UTAUT, security, banks, Jordan.

1 Introduction

Numerous studies have been conducted related to the adoption of e-payment system to help customers to create awareness to adopt the e-payment, it will also significant for the banking industry as it provides the guide to upgrade their policy so that the consumer can trust and use e-payment more frequently [1,5]. Internet brings incredible changes to the world and so for the banking sector, banks has now introduced their online services [5]. This change has considered an innovation for the whole banking industry globally [1]. This facilitates the customers to perform a variety of operations either financial or non-financial via bank websites like e-payment. It has been observed from recent times that internet banking has contributed the large piece in terms of profit of electronic commerce application [50]. Whereas a number of banks open their internet banking to minimize their cost of operation as well as to advance the customer service [49]. Banking through the internet allows the customer to perform their task individually and simultaneously make timely delivery of service. Another advantage of internet banking is its availability as it can be used 25 hours which in return allow the bank to retain their customer at the same time it is an edge in the banking sector.

To have a smooth and advanced e-payment system, it is required to have a well-developed information technology because it is the process where no physical cash is involved while making a transaction of either goods or services. E-payment is considered as a payment system that uses an electronic or non-cash medium to create payment [45]. Recent times show the massive growth of e-payment that indicates its potential to involve and convince the poor communities and unbanked persons to use the services of e-payment. This draws a graph that shows the shift of the economy from the cash-based to the cashless. In short, we can classify the instrument of payment into two large parts one is cash (paper or physical cash) and another is non-cash instruments (e-payment). An economy can be cash or non-cash based conditionally on the usage of the service of e-payment [53]. The growing market of electronic payment underlines its importance and necessity to advance all payment system utilizing e-payment [30].

On the contrary, Jordan has invested a large amount of money and time to make its people adopt the facilities of electronic payment but the rate of adoption of technology is slow in Jordan. In Jordan, the services of electronic payment like E-Fawateercom, e-bills that was established by the e-payment system with an association of Your

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Payments Company for the customer to use e-payment, EMP (Emerging Markets Payments Jordan) act as a hosting company and MIGS act as a subsidiary company for e-payment that deal in Master Card. Citizen has established a full system to conduct electronic payments for the private sectors or agencies of government by using the internet services to have safe and secure transaction. The system is helpful for manufacturer of the services or by financial firms. The system has a stricks rules and works under a strong phenomenon that protects the procedure of buying and every other detail of a transaction done by using this service. Although the usage of this service exists in Jordan, still there was no sufficient study available in Jordan's perspective that explores the factors that influenced the adoption of e-payment [12,6].

The current study utilizes UTAUT and extended the model with security factor. This theory defines the behavior acceptance of the technology. Previous studies focus on education, banking sector, and manufacturing. However current study investigates the e-payment consumer. This study further helps other companies to establish the same solution.

2 Literature Review and Empirical studies

There are many other theories of technology but the UTAUT model is considered one of the best theories to explain the nature of adoption. The formulation of UTAUT is dependent on several models of research i.e. reasoned action theory, the model of technology acceptance, motivational model, TAM–TPB hybrid model, planned behaviour theory, a theory of innovation diffusion and PC utilization. [48] studied this model and concluded that effort expectancy, facilitating condition, performance expectancy, and social influence have a significant impact on technology adoption. According to the result the UTAUT model elucidates 70 percent of the variability in the users' behaviour to use the technology. There are number of researches that worked on technology adoption and employed UTAUT as the base model in their studies some of them are worth mentioning [51,13,39].

Performance Expectancy (PE)

It has been claimed by the researchers that if an individual adopts the technology it will help them to perform better and it is called performance expectancy [24]. It is the belief of the user that the technology he or she is using helps to achieve efficiency and improve the quality of work. Based on this belief usage of technology become significant [25]. The user that implies low-performance expectancy makes hurdle for the adoption of technology. Performance expectancy can be defined as the advantage that consumers avail by using e-payment such as security, speed, and transaction convenience performance expectancy contribute a positive impact to use the system of e-system. Another researcher [43] investigates the relationship of effect expectancy and found a positive impact of e-payment. To analyse the impact of Performance Expectancy see the following claim:

H1. Performance Expectancy and the e-payment adoption by bank consumers are positively related.

Effort Expectancy (EE)

The term EE is referred as the level of ease and comfort an individual can exercise while adopting technology to perform their task. The easiness level of tasks can further define as the state where individuals useless intellectual effort to perform their job by using technology [24]. In short, it required less effort to absorb, apply, and use technology. In contrast, if the technology is hard to understand and use the resistance will be higher and it will be difficult to adopt. In term of e-payment effort expectancy is the perceived level of ease a consumer can enjoy when using the system of electronic payment in e-commerce and online transaction, additionally, it also has easy to understand criteria and does not require any specific skill [38]. Following [30] the positive impact of EE on e-payment adoption can be hypothesized as under:

H2: Effort Expectancy and the e-payment adoption by bank consumers are positively related.

Social Influence (SI)

To explain the term of social influence an old saying can be quoted here 'the old birds teach the young ones how to fly'. Our society influences the adoption of technology such as our elder, top management, and parents are the key influencer that convinces the adoption of any technology. The confidence to use technology comes from social influence; it shows the significance of technology and proves the user to adopt it [47]. A study conduct by [28], states that users are been influenced by the surrounding and it motivates them to adopt the new technology. Another study has been conduct to explore the impact of social influence results shows the positive impact, it can be stated that the society and the surrounding of an individual has a major impact to build user perception to adopt the technology [4]. SI positively influence behavioural intention to adopt e-payment [30]. To analyze the impact of Social Influence the study claims as follows:

H3. Social Influence and the e-payment adoption by bank consumers are positively related.

Facilitating Conditions (FC)

Facilitating condition is the state where users decide based on the support and resources available to adopt the technology [3]. Grounded on UTAUT, behavioural intention generated by EE, PE, SI whereas, FC and BI

decide whether to adopt the technology or not. [11] defined facilitating conditions as the available infrastructure of technology that the firm provides to potential consumers to support the use of the system. Likewise, UTAUT's previous model also has a factor of facilitating conditions such as behavioural control perceived by TPB/DTPB, compatibility of DOI, facilitating condition of TAM-TPB. Incongruously, the impact of FC reduces the presence of EE and PE on BI. Empirical evidence shows that older worker with experience has a stronger influence, thus experience and age act as a moderator [48]. [15] found that facilitating conditions significantly impacts behavioural conditions. To analyze the impact of Facilitating Conditions see the hypothesis below:

H4. Facilitating Condition and the e-payment adoption by bank consumers are positively related.

Security

Security is the main aspect of online transaction [46]. In the e-payment perspective security can be to break into legal, system security, and transaction. E-payment can consider secure and personal only when the system satisfies the customer by fulfilling the security expectation that the process is safe and secure [9]. While security in terms of e-payment is nothing but the secure means of payment and protected mechanisms of information storing [29]. In short, it is the technical perspective that assures authentication, confidentiality, integrity, relationship non-recognition. To reach the security level, digital signature, encryption, and algorithm of checksum/hash are the basic mechanisms of security that pledge integrity, authentication, confidentiality [16]. Security is the significant factor that influences the e-banking operation as well as e-payment usage [42]. This statement is true because a customer may have confidence in their bank but may have doubt in the system of e-payment. It is the nature of the user that they want to have control over the shared data [26]. The security level would decide about the e-payment system [2]. Security plays an important role while making e-payment [23]. The finding of study conducted by [10] indicted that the security effect significantly on the adoption of e-payment system. To analyze the impact of security following hypothesis is projected:

H5. There is a positive relationship between security on the e-payment adoption by bank consumers.

3 Methodologies

The present work is a quantitative study having the data of 370 respondents from banking sector of Jordan. According to [35], the suggest minimum sample should be based on power of analysis. The Application of G.Power for determining the sample size, with five predictors, provide the value of 0.8 suggesting Medium effect size [18], the suggested minimum sample is 92 respondents. Thus with 370 respondents of the study, sample size was not an issue of the study.

Applying convenience sampling method, data were collected via online. The study is only concern on theoretical effects of the research model, convenience sampling still suffice. For collecting the data, a close ended questionnaire containing the demographic and main constructs' questions. The results of tested done to ensure the reliability and validity of the questionnaire met all the standard criteria. The statements regarding the constructs were based on the interval scale having five-point likert type.

Sample size; data collection process

The data was analysed employing the partial least square technique of structural equation model, for that Smart PLS 3 was used. This technique is variance based structural equation modelling and helps analyse complex models with several relationships and focuses on predicting and testing the theory. The present article tests the theoretical relationships of the variables included in the model and provides an empirical evidence based on the on hand collected data of 370 customers from Jordanian banking sector.

4 Data Analysis

Demographic profile analysis

The results indicated that the percentage of male was 75.7% and the percentage of female was 24.3%. Regarding the age the results indicated that the highest percentage is 53.2 for age ranged between 20 to 25 and second percentage is 25-30 is 16.5 then 15.9 for age under 20 and finally 14.3 for age above 30.

Hypotheses testing

The study utilizes structural equation model based on variance. The technique is also called partial least squares (PLS) modelling. For the analysis we used PLS 3.3.2 version [41] as the statistical tool to examine the validity and reliability of the model in the first phase i.e. measurement model and hypotheses testing in the second phase i.e. structural model as the nature of the study is merely on predictive purposes [21,33] Since the study used a single source data, common method variance (CMV) could be an issue for the study [36,32] .To remedy the CMV, the study followed suggestion by [27]. CMV could be a serious threat of the study if the result shows the VIF ≥ 3.3 for the VIF of the current study see Table 1 below. There is no value greater than the threshold mentioned above hence it ensures the absence of multicollinearity.

Table 1: Full Collinearity.

BI	EE	FC	PE	SI	PS
1.855	2.698	2.013	2.086	2.008	1.123

The study employed a two stages approached in testing the hypothesis of the study. The first stage consists of measurement model, which consist of the convergent and discriminant validity [8]; [34]. Once the validities has been confirm, the study will proceed to the hypothesis testing, or the structural model.

Firstly we discuss the convergent validity how each item of a latent construct measures the construct [22]. For ensuring the convergent validity the minimum criteria of items loading is 0.5, Ave should also be 0.5 or above and the composite reliability should be minimum 0.7 [22]. See table 2 for all the above mentioned criteria for ensuring convergent validity.

Table 2: Convergent Validity.

Construct	Item	Loading	CR	AVE
Intention	BI1	0.847	0.874	0.699
	BI2	0.859		
	BI3	0.802		
Effort Expectancy	EE1	0.787	0.864	0.614
	EE2	0.760		
	EE3	0.794		
	EE4	0.793		
Facilitating Condition	FC1	0.740	0.836	0.630
	FC2	0.842		
	FC3	0.796		
Performance Expectancy	PE1	0.842	0.893	0.677
	PE2	0.871		
	PE3	0.825		
	PE4	0.748		
Social Influence	SI1	0.681	0.823	0.538
	SI2	0.758		
	SI3	0.766		
	SI4	0.726		
Perceived Security	SII1	0.838	0.798	0.575
	SII2	0.565		
	SII3	0.839		

Note : FC4 was deleted due to cross loading

In the second step the assessment of the discriminant validity was made. For that HTMT criterion was used. The HTMT was initially suggested by [54] and later endorsed and updated by [55]. The suggested values for the criterion are at most 0.90. The table 3 depicts the values of HTMT and all the values are meeting the criteria as all of them are under 0.9 hence all six construct are distinct from each other. The reliability and validity of the measurement model is hence confirmed by the above tests.

Table 3: Discriminant Validity (HTMT).

	BI	EE	FC	PE	SI	Sec
BI						
EE	0.731					
FC	0.764	0.865				
PE	0.654	0.840	0.727			
SI	0.750	0.853	0.768	0.717		
Sec	0.265	0.190	0.302	0.284	0.295	

Structural Model

The skewness and kurtosis of the individual items was examine to ensure the multivariate normality [22]. The skewness and kurtosis as done by [33] we followed them and tested for normality however the results suggested the non-normality in the data set.

The p-values for Mardia for the distribution statistics as less than 0.05 hence we followed [20] and reported the coefficients and standards error of the relationships. Moreover the t-statistics and probability values were also reported. For testing the hypotheses we performed bootstrapping technique using 5000 samples. We also taken in account the effect size i.e. f2 all the above mentioned results are provided in table no. 5 below. It can be noticed that all the criterion have been achieved.

With 5 predictors on BI, the R2 was 0.461, which shows that all the 5 predictors explained 46.1% of the variance in BI. Effort expectancy ($\beta = 0.154$, $p = 0.015$), Facilitating condition ($\beta = 0.247$, $p = 0.001$), Performance expectancy ($\beta = 0.140$, $p = 0.018$), and Social influence ($\beta = 0.238$, $p = 0.001$) were all positively related to BI, thus H1, H2, H3 and H4 were supported.

However, for the Perceived security with ($\beta = 0.073$, $p > 0.05$), the study found that it was not significant factor to BI. Thus H5 was unsupported. According to [14], 0.02, 0.15 and 0.35 for the f2 is representing the small, medium, and large effect size. Hence it can be noticed that all hypotheses that supported have small effect size. See table 4 below and fig. 1 showing the results of hypotheses testing along with effect size.

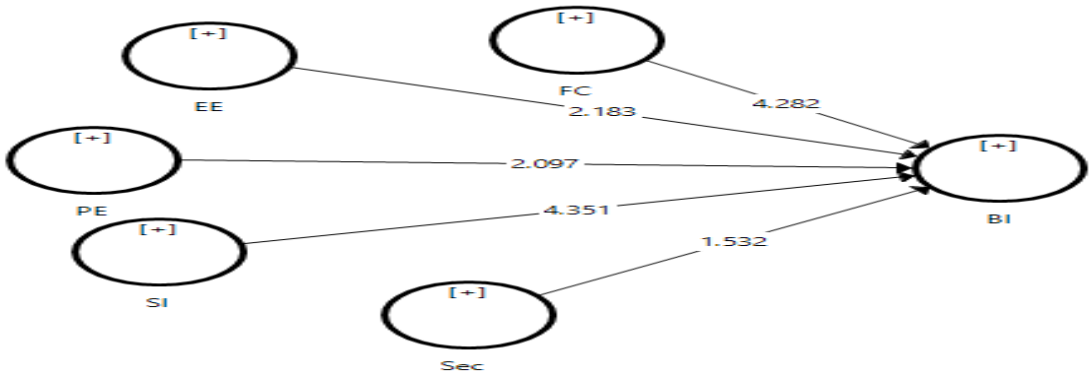

Fig.1: Hypothesis testing.

Table 4: Hypothesis testing for Direct Relationships.

No. of Hypothesis	Path	coefficient	Std. Error	T Stats	P Value	5.0%	95.0%	f2	R2	VIF
Hypothesis 1	**PE → BI**	0.140	0.067	2.097	0.018	0.028	0.248	0.02	46.1	2.049
Hypothesis 2	**EE → BI**	0.154	0.071	2.183	0.015	0.045	0.270	0.02	-	2.654
Hypothesis 3	**SI → BI**	0.238	0.055	4.351	0.001	0.136	0.319	0.06	-	1.903
Hypothesis 4	**FC → BI**	0.247	0.058	4.282	0.001	0.148	0.335	0.06	-	1.899
Hypothesis 5	**Sec → BI**	0.073	0.047	1.532	0.063	- 0.012	0.131	-	-	1.114

[44] suggested PLS predict, holding sample based approach that provide case-level predictions following the 10-fold procedure. This assessment is done to check the predictive relevance of the model. The lower differences in the items in PLS-LM has strong predictive power while in case of high difference the predictive relevance cannot be assured. However in case of mostly low differences the predictive power is moderate and contrast in the case where majority is high difference. The table 7 shows that all the error of the model were less than the LM model suggesting that the model has strong predictive relevance.

Table 5: Results of PLS Predict.

	RMSE			
Item	PLS	LM	PLS - LM	Q^2_predict
BI3	0.912	0.941	-0.029	0.24
BI2	0.871	0.889	-0.018	0.326
BI1	0.884	0.897	-0.013	0.34

5 Discussions

In order to have a smooth and advanced e-payment system, it is required to have a well-developed information technology because it is the process where no physical cash is involved while making a transaction of either goods or services. E-payment is considered as a payment system that uses an electronic or non-cash medium to create payment [45]. The growing market of e-payment underlines its importance and necessity to advance all payment system utilizing e-payment [30]. The current study focuses on the theory of UTAUT with the added variable of security. This model is widely used to define the behavior acceptance of the technology. Previous studies focus on education, banking sector, and manufacturing. However current study investigates the e-payment consumer. This study further helps other companies to establish the same solution. With 5 predictors on BI, the R2 was 0.461. H1, H2, H3 and H4 were supported. However, for the Perceived security, the study found that it was not a significant factor in BI. Performance expectancy can be defined as the advantage that consumers avail by using e-payment such as security, speed, and transaction convenience performance expectancy contribute a positive impact to use the system of e-system. Another researcher [43] investigates the relationship of effect expectancy and found a positive impact of e-payment. The finding of the current work is also aligned with the above researches and found a positive impact of performance expectance on behavioural expectations. Moreover, PE and BI were found to be positively and significantly correlated [30]. In term of e-payment effort expectancy is the perceived level of ease a consumer can enjoy when using the system of electronic payment in e-commerce and online transaction, additionally, it also has easy to understand criteria and does not require any specific skill [38]. [30] found a positive relationship of Effort expectancy and behavourial intention. The findings of the current study can be linked with the above research. Another study explored the impact of social influence results shows the positive impact, it can be stated

that the society and the surrounding of an individual has a major impact to build user perception to adopt the technology [4]. SI has a positive and significant impact on BI to adopt e-payment [30]. Incongruously, the impact of FC reduces the presence of EE and PE on BE. Empirical evidence shows that older worker with experience has a stronger influence, thus experience and age act as a moderator [48]. [15] found a significant impact of facilitating conditions on behavioural conditions. All the above results support study findings.

6 Conclusions

The reaction towards the development of e-payment methods in Jordanian market needs serious concentration by the banking. The study provides several recommendations for the policy makers for appropriate legislation on e-commerce particularly in developing countries where e-commerce is still at the infantry level. The legislation framework may adopt the local environment that may help in booting the e-commerce. The findings of the study suggest that the factors taken in account in the current framework are all together able to explain around 46% variation in behavioural intention of using e-payment. The e-payment has been an easy way for the users to transact money without any hassle these days even they are from any background. This has been only enabled by the ease of use of the technology these days hence there is great increase in users for the e-commerce in modern days.
The empirical results show that EE ($\beta = 0.154$, $p = 0.015$), FC ($\beta = 0.247$, $p = 0.001$), PE($\beta = 0.140$, $p = 0.018$), and SI ($\beta = 0.238$, $p = 0.001$) were all positively related to behavioural intention. There has been a great issue of data privacy of the customers by the e-commerce companies. However the modern and updated e-payment gateway is more equipped by the privacy and security features that is really helpful to boost online transactions that will move many individuals to adopt e-commerce. This will help Jordanian websites as well as international websites to increase their business. The lack of knowledge about technologies is one of the reasons that the users are at the risk while purchasing or transacting online. However the new framework reduces this risk to a great extent and online customers are now having a better framework which is more attractive and competitive at the local and international level providing the facility of more information based transactions for vendors and buyers both. The same is reflected in the data analysis of the current research that Facilitating condition, Effort expectancy, Performance expectancy and Social influence has a significant impact on behavioural intention but Perceived security found that it was not a significant factor to BI, all the supported variable has a small effect size except facilitating condition and perceived security as they have high impact.

7 Limitations

This study limits its generalization to the geographical context of Jordan only. The culture and social characteristics of Jordan are different from the other countries hence the generalization of the findings to other nations will not be justifiable. Furthermore the study limits itself to Jordanian banking industry only that is another limitation of the study. The big corporation and public limited companies that are non-banking have not been studied in this research. The sample size of the study can also be increased. From the methodological aspect of the research the study is only limited to quantitative data collection however for the deeper insights qualitative data may be useful to reap better results.

8 Future Researches

The recommendation for the future studies includes: working on the regional level and comparing different countries will provide much better understanding of the phenomena. The model can be tested in the case of public limited companies and other big corporations. Also a comparative study of different business sectors can be employed. The more modern data analysis techniques such as multi-level modelling can be applied to the data so that it may provide the more insights and help understanding the perspectives at different levels of organizational hierarchy. The qualitative data such as interviews may provide in-depth understandings and the quantitative finding can be explained in a better way.

Conflict of interest

The authors have no conflicts of interest to disclose.

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